REMARKS

Summary of Prosecution History of Present Application

Claims 1-6 are pending in this application. In this seventh and latest Office Action, the Office has rejected all claims under 35 USC 102(e) as anticipated by US Patent No. 6,052,582 to Blasing et al (hereinafter Blasing '582).

Applicant respectfully traverses this rejection.

Blasing '582 is a continuation of U.S. Patent No. 5,771,449 (hereinafter Blasing '449) , which has an identical specification to Blasing '582. In the second Office Action in this case, the Office rejected claims 1-3 as anticipated by Blasing '449[1]. The claims of the present application have not been amended since that second Office Action in any way significant to the Blasing references.

The Office withdrew the rejection based on Blasing '449 contained in the second Office Action in view of Applicant's arguments. Also in the response to that second Office Action, Applicant added new claims 4-6, which are method claims that are similar to apparatus claims 1-3 and which distinguish over Blasing for at least all of the same reasons as claims 1-3.

In the third and fourth Office Actions in this case, the Office rejected claims 1-6 based on a third set of prior art. Specifically, the Office rejected the claims as obvious over Blasing '449 in view of Langston.

However, the Office subsequently also withdrew the obviousness rejection based on Blasing '449 in view of Langston contained the third and fourth Office Actions in view of Applicant's arguments.

In the fifth Office Action in this case, the Office rejected claims 1-6 as anticipated under 35 U.S.C. 102(e) by a fourth new prior art reference, namely, U.S. Patent No. 6,473,616 to Sydor.

In response, Applicant pointed out, *inter alia*, that Sydor was not prior art under 35 U.S.C. 102(e) because the present application has an earlier effective filing date than Sydor. The Office subsequently withdrew the rejection based on Sydor.

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1 The Office had previously rejected claims 1-3 in the first Office Action based on completely different prior art, but withdrew that rejection in view of Applicant's response to the first Office Action.

In the sixth Office Action, the Office again rejected claims 1-6, this time under 35 U.S.C. 102(a), in view of a fifth new reference, namely, an alleged Canadian published patent application corresponding to Sydor. However, the Office neither provided nor cited that alleged Canadian patent publication. Furthermore, it turns out that the Office was relying on the filing date of Sydor's Canadian counterpart patent application, which, of course, does not constitute prior art under any section of the patent statute. The Office subsequently also withdrew the rejection based on Sydor's alleged Canadian counterpart.

Now, in the seventh and latest Office Action, the Office is rejecting claims 1-6 as anticipated by Blasing '582, which, at first blush, appears to be a sixth new prior art reference, but, as noted above, is actually identical to the Blasing '449 reference that was asserted in the second Office Action.

It is unclear how or why the Office keeps discovering allegedly new prior art that was available and should have been cited at the time of the first Office Action or why the Office is recycling prior art rejections that have already been overcome.

Nevertheless, Applicant has already overcome this anticipation rejection based on Blasing (in fact, Applicant has already overcome a subsequent obviousness rejection based on Blasing in combination with Langston).

Below is a copy of the arguments from the response to the second Office Action that Applicant has already proffered <u>and which the Office has already accepted as persuasive</u> as to why Blasing does not anticipate claims 1-6.

<u>**Excerpt From Applicant's Response To The Second Office Action**</u>

The present invention relates to an LMDS antenna array having multiple radiating antenna elements wherein the antenna elements are adjusted in phase and amplitude to achieve certain novel radiation patterns. Particularly, claim 1 includes the limitations that the antenna elements are adjusted in phase and amplitude (1) to mitigate radiation above the horizon and (2) to decrease attenuation in radiating power with distance from the antenna. Claim 2 depends from claim 1 and further adds that the antenna elements are adjusted in phase and amplitude to mitigate nulls between lobes of combined radiated signals. Finally, claim 3 depends from claim 1 and adds that the antenna elements are adjusted in phase and amplitude to reduce excess signal power at near range.

The Office asserted that Blasing discloses a local multi point LMDS system with an antenna for transmitting a signal of reused frequency within a specified range from the antenna. The antenna having multiple radiating

antenna elements, each of the antenna elements being adjusted in phase and amplitude (1) to mitigate radiation above the horizon, for example, due to weather conditions (referring to Figure 3 and column 8, lines 7-17), (2) to decrease attenuation in radiated power with distance from the antenna (referring to column 21, lines 40-53), (3) to mitigate nulls between lobes of combined radiated signals collectively from the antenna elements, for example, the maximum and minimum power level is maintained by implementing the low sidelobe or shaped beam antennas adjacent to sectors (referring to column 23, lines 35-50), and (4) to reduce excess signal power at near range, for example, an excess power output is reduced at near range or at adjacent sectors by eliminating unwanted energy by using low sidelobe antennas (see column 22, lines 35-50).

Of course, LMDS systems with antennas with multiple radiating elements are known in the prior art and Blasing is an example of one such system, Blasing clearly does not teach any of the four phase and amplitude design elements set forth as the key limitations of the claims. More particularly, Applicant has reviewed the Blasing reference and, particularly, the sections cited in the Office Action and, contrary to the Office's assertions, has found none of those design elements disclosed or discussed in the reference.

Applicant shall more specifically address each element individually.

With respect to mitigating radiation above the horizon, the Office asserts that "radiation or signal power output can be attenuated above the horizon, for example, due to weather conditions between some certain geographical regions". Applicants do not understand the above quoted statement. First, weather conditions have nothing to do with adjustment of the phase and amplitude of the radiated signal across the radiating elements, as claimed. Therefore, even if weather did affect radiation above the horizon, it does not appear to have any bearing on the claims since any such effect would not be the result of adjustments in phase and amplitude of the transmitted signal across the antenna elements, but of external conditions.

Secondly, with respect to the limitation of claim 1 of attenuating power with distance from the antenna, the Office referred to column 21, lines 40-53, which read:

> The polarization isolation provides 20 to 30 dB of isolation even if the antenna arrays that serve different sectors are in the same physical space (separated only by the size of the respective antennas). Better performance can be realized by implementing low sidelobe or shaped beam antennas. An antenna array with a uniform illumination will produce a sidelobe that is 13 dB lower than the main antennas's gain at the center of the beam. This first sidelobe can be reduced to 20 or 30 dB with proper attention to design of the amplitude and phase characteristics of each radiating element. These antennas are used to ensure that the next sector over receives interfering signals from the once removed adjacent sector that are 7 to 17 dB lower in size. The signal to noise ratio is also enhanced using this technique.

The above quoted section of Blasing does not discuss attenuation as a function of distance from the antenna. Rather, it discusses attenuation as a function of the radiation angle. Accordingly, Blasing does not meet this limitation either.

Accordingly, claim 1 clearly distinguishes over the prior art of record.

With respect to claim 2 and the limitation of mitigating nulls between lobes of combined radiated signals, the Office refers to column 23, lines 35-50 of Blasing. Column 23, lines 21 through 61 state.

> Sources of Potential Signal Interference in a system such as that described in this Specification, a major concern is co-channel interference originating from multiple transmitters contained in various sectors and/or cells. Four sources of such interference require special concern a) Spillover interference from once sector to another, as experienced by receivers located along the boundary between sectors (See Spillover "8" in FIG. 43B). This factor becomes increasingly critical as sector beamwidth decreases, as the portion of a sector affected by spillover becomes an increasingly large percentage of the total area. b) Interference arising from the first sidelobe of an antenna transmission pattern. The intensity of this interference source peaks in the middle of the adjacent sector. (See First Sidelobe "2" in FIG. 43B.) c) Interference arising from the second sidelobe of an antenna transmission pattern. Intensity peaks in the center of the second adjacent sector. (See Second Sidelobe "3" in FIG. 43B.) Typically, interference from third and higher sidelobes can be considered negligible, d) Interference experienced at receivers located in an adjoining cell. (See FIG. 43C). These may be located at the node or at customer premises. In the basic embodiment of the invention, isolation from the above classes of interference can be obtained in three ways a) Through horizontal directionality, providing the ability to reject signals arriving from adjacent sectors or adjoining cells, where the angle of incidence differs significantly from the direct horizontal line between the transmitter and receiver, b) Through vertical directionality, providing the same ability to discriminate between transmissions from the closest node and one located in an adjoining cell, c) Through signal attenuation due to free-space, atmospheric, and rainfall attenuation. This factor tends to favor a signal from a nearer, rather than a more distant source.

The Office appears to assert in the Office Action that this section of Blasing teaches a system in which "the maximum and minimum power level is maintained by implementing the low sidelobe or shaped beam antennas in adjacent sectors".

The above quoted portion of Blasing does not appear to mention nulls between lobes, let alone mitigation of them. Further, this section of Blasing does not even appear to teach implementing low sidelobes or shaped beam antennas in adjacent sectors as asserted by the Office, and, even if it did, low sidelobes is very different than minimizing nulls between lobes.

Accordingly, claim 2 distinguishes over the prior art for all of the reasons set forth above in connection with claim 1, (from which it depends) as well as the reasons discussed immediately above in connection with the limitation added by claim 2.

With respect to claim 3 and the limitation concerning reduction of excess signal power at near range, the Office asserted that Blasing discloses this feature in column 22, lines 35-50, which read:

> Use of Shaped Beam or Ultra Low Sidelobe Antennas to Improve Signal to Noise in Adjacent Sectors
>
> An additional aspect which may be implemented in conjunction with the system described above is to use low sidelobe antennas as the transmitter sources at the node. This gives the advantage of reducing the sidelobe in the one over adjacent sectors where the polarization is again the same as for the transmitting antenna.

> There are two basic approaches. The first involves using antennas which distribute power to the individual radiating elements so that the center-most elements radiate more power than the elements at the periphery of the antenna. In this fashion, the first sidelobe exposed to the one over adjacent sector is substantially lower. This results in a lower level of unwanted energy in the one over adjacent sector.

Once again, this section of Blasing does not appear to have anything to do with the subject matter at issue, namely, reducing excess signal power at near range. Rather, this section addresses radiation as the function of the angle of radiation. The feature claimed in claim 3 is discussed on page 6, lines 17 through page 7, line 12 and Figure 1 of the present application. This feature is demonstrated in Figure 1 most notably by the difference between trace 6 (prior art) and trace 7 (invention) in the zero to 1000 meter portion of the graph. The above cited section of Blasing simply has nothing to do with near range gain.

Accordingly, claim 3 distinguishes over the prior art for all of the reasons set forth above in connection with claim 1, from which it depends, as well as the additional reasons set forth above in the discussion of near range signal power.

Applicant has also added new claims 4-6, which are method claims essentially corresponding to claims 1-3, respectively. Accordingly, these new claims are allowable over the prior art for at least the reasons discussed above in connection with claims 1 through 3.

Additional Comments Responsive To The Present (Seventh) Office Action

Applicant notes that, in the present Office Action, the Office has partially relied on different portions of Blasing than it did in the second Office Action. However, the variations do not support the rejection any better than was the case in the second Office Action. Accordingly, Applicant will also now separately address those aspects of the present rejection.

Specifically, with respect to the issue of teaching adjusting the phase and amplitude of the signals into the antennas to mitigate radiation above the horizon as recited in claim 1, the Office cites col. 8, lines 33-56 of Blasing '582, which states:

> FIG. 5 is a schematic depiction 42 of the line of sight requirements for a sectorized antenna 46 as it communicates with subscribers in residential and business communities 38 and 40. The locations and configurations of particular sectorized antenna arrays are determined by the signal frequency and bandwidths needed for particular customers. Service to customers is required to be substantially line of sight between nodes N and customer interface units 44. Both natural and man-made structures, such as mountains M, trees TR, foliage and buildings B can diminish the effective area served by a sectorized antenna array. These obstacles may be overcome by careful placement of the arrays and by customizing antenna networks to adapt to specific local requirements.

> In some neighborhoods, it may be desirable to locate the sectorized array 46 on a tall tower, building, mountain or similar object. Such a location enables the transmission of signals down to customers 38 and 40, and avoids many potential signal barriers. Sectorized antennas 46 can also be used to receive the broadcast signals and broadcast them below the level of obstacles such as foliage. These methods allow an increased percentage of area coverage for rural, hilly or urban areas.

This portion of Blasing says nothing about adjusting the signal applied to the antennas in phase and amplitude to mitigate radiation above the horizon. This section merely discussed <u>where</u> the antennas should be physically placed, namely, high on a mountain or building so as to provide good lines of sight to the receivers (in neighborhoods with tall buildings) and/or low to the ground so as to provide good lines of sight to the receivers below foliage (in neighborhoods with lots of trees). This has nothing to do with the radiation pattern of the antenna, let alone the phase and amplitude of the signals provided to the antennas in order to achieve a particular radiation pattern. The statement made in Blasing in connection with the mountain/building-top scenario that "such a location enables the transmission of signals down to customers 38 and 40, and avoids many potential signal barriers" cannot reasonably be taken to mean anything other than that the line of sight between the antennas and the receivers is downward because the receivers are a ground level whereas the antennas are high up.

With respect to the issue of teaching adjusting the phase and amplitude of the signals into the antennas to decrease attenuation of radiated power with distance, as also recited in claim 1, the Office cites col. 22, lines 20-53 of Blasing, which states:

> Use of Shaped Beam or Ultra Low Sidelobe Antennas to Improve Signal to Noise in Adjacent Sectors
>
> An additional aspect which may be implemented in conjunction with the system described above is to use low sidelobe antennas as the transmitter sources at the node. This gives the advantage of reducing the sidelobe in the one over adjacent sectors where the polarization is again the same as for the transmitting antenna. There are two basic approaches. The first involves using antennas which distribute power to the individual radiating elements so that the center-most elements radiate more power than the elements at the periphery of the antenna. In this fashion, the first sidelobe exposed to the one over adjacent sector is substantially lower. This results in a lower level of unwanted energy in

> the one over adjacent sector.
>
> Shaped Beam Antenna Patterns
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> Another feature of the invention involves the use of a shaped beam antenna. In this case, the transmit antenna emanates a shaped beam with the kind of pattern 300 shown in FIG. 41. FIG. 40 illustrates a conventional beam pattern 298 that is formed without beam shaping. As can be seen from the figure, the 3 dB roll off within the main beam is reduced to approximately 1 dB. This results in a reduced amount of power necessary to illuminate the edges of the sector with minimum power levels as compared with the conventional antenna. Either the center of a sector receives 3 dB excess power or the sector edge receives 3 dB to little power, depending on the point of reference when using a conventional antenna. For the shaped beam antennas the difference is only 1 dB, a substantial improvement. This has the advantage of reducing the power spillover into the next cell in a cellular system. See FIG. 41. The shaped beam antenna also has very good sidelobes which result in low levels of one over adjacent sector unwanted signals.

First, Applicant notes that this is the same section of Blasing that the Office previously relied upon in the second Office Action as allegedly teaching the limitation of claim 3 concerning reduction of excess signal power at near range.

In any event, exactly as discussed in the response to the second Office Action, the above quoted section of Blasing does not discuss attenuation as a function of distance from the antenna. Rather, it discusses attenuation as a function of the radiation angle, which is irrelevant to this claim element. Accordingly, Blasing does not meet this element either.

Finally, with respect to the limitation of claim 3 that the signals are adjusted in phase and amplitude to reduce excess signal power at near range, the Office relies on the exact same portion of Blasing discussed above, namely, col. 22, lines 20-53. This also is the same portion of Blasing that the Office previously relied on in the second Office Action as allegedly teaching this feature. As stated in the response to the second Office Action:

> Once again, this section of Blasing does not appear to have anything to do with the subject matter at issue, namely, reducing excess signal power at near range. Rather, this section addresses radiation as the function of the angle of radiation. The feature claimed in claim 3 is discussed on page 6, lines 17 through page 7, line 12 and Figure 1 of the present application. This feature is demonstrated in Figure 1 most notably by the difference between trace 6

(prior art) and trace 7 (invention) in the zero to 1000 meter portion of the graph. The above cited section of Blasing simply has nothing to do with near range gain.

Accordingly, claim 3 distinguishes over the prior art for all of the reasons set forth above in connection with claim 1, from which it depends, as well as the additional reasons set forth above in the discussion of near range signal power.

Conclusion

In view of the foregoing remarks, this application is now in condition for allowance. The Examiner is invited to contact Applicant's undersigned counsel by telephone call in order to further the prosecution of this case in any way.

Respectfully submitted,

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